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ABSTRACT

A model for the selection of individuals into institutions and their subsequent socialization is formulated which is defined in terms of qualitative rather than quantitative data; these data are hierarchical in character and are defined at several points in time. Variables defined for individuals and variables defined for institutions were distinguished. This partition of variables and, therefore their effect, implies a hierarchical model. This model allows the separation of the effects of policy-important institutional variables into structural (direct) and compositional (indirect) subcategories. The individual-level component of the model allows assessment of the distinct effect of each individual-level variable. On the basis of the institutional-level component of the model, two kinds of institutional effect may be assessed: those on the distributions of individual-level variables, i.e., on the kinds of persons acting in different institutions, and those directly on outcomes. Via the above decomposition of total effects in the model, both direct and indirect effects of institutional-level policy variables on outcome may be assessed: those mediated through the distribution of kinds of institutional actors and those directly affecting outcomes. (Author/RC)

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A QUALITATIVE LONGITUDINAL MODEL FOR ASSESSING SOCIALIZING AND SELECTION EFFECTS OF EARLY EDUCATION INSTITUTIONS

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A primary problem in studies of socialization is to discover the impact of events in the child's environment and interactions with other persons on the development of later characteristics. Two of the major methodologies for investigating the impacts of these occurrences have been the longitudinal study and the cross-sectional retrospective study. In the first, longitudinal information is collected on usually a small number of children over an extensive period of time. These time periods may last from a few months to even forty years as in the classic example of Terman's Study of Gifted Children (Oden, 1968) or the Berkeley Growth Study (Block, 1971), both also being examples of studies involving a large number of children. The measurement intervals usually vary from daily and weekly to ten year gaps, the close spacing being chosen for the first months of infancy. Sometimes the spacing of the observations on the children is coordinated with the anticipated rates of change or growth of the developing characteristics. In addition, information is sometimes collected on the general characteristics of the family (mostly the mother) and attempts are made to relate these variables to the child's growth along important dimensions. The other type of study is what might be called the cross-sectional retrospective study. In this type of study children are measured with respect to their characteristics at one point in time and the parents are questioned about their general child rearing practice and attitudes, hopefully reflecting their treatment of the child during the time period prior to the measurement.

In a longitudinal study, we typically have a broad variety of characteristics at each point in time (resulting in multiple initial and final sets of characteristics) and some measurement on intervening events. On the other hand, in the retrospective cross-sectional study we have data at one point in time and diffuse information relevant to events preceding that point. Conceptually, we have three general sets of variables: The child's initial characteristics, the intervening events, and the resulting characteristics. Any longitudinal model for the socialization process must then include these components.

Longitudinal models have long been seen as tools for making more successful inferences about developmental and educational processes when experimentation has been impossible or extraordinarily difficult to validly implement. As a consequence, the production of models for such data and more general data-analytic techniques has been an important area of psychometric and statistical research. It is very important that the models and procedures generated by such research have two characteristics. One is that they should yield information which is directly relevant to the substantive issues which an empirical investigator is addressing. The second is that such models and procedures should characterize data sets in an accurate way, that is to say, they should not be based, in important ways, on assumptions which bare little resemblance to empirical reality.

An important test of the relevance of the models to empirical investigation is given by applications of such models to real data sets generated by substantive empirical investigations. The reason that

this is an important test is because there is very little discussion of the issues of model appropriateness in either the statistical literature or the substantive literature to which the models are applied.

This report will describe and exemplify a new model for the analysis of longitudinal data. The exemplification provides a first test of the model's utility.

The model has two characteristics which will channel its use and control the inferences based upon it. In the first place, it is a model for the analysis of qualitative longitudinal data. That is, all of the "variables" or constructs which are operationalized for inclusion in the model are in the form of category systems rather than continuously scaled measurements. Models for qualitative data are important for the study of the early socialization process because the wide variety of psychological instruments producing quantitatively scaled measurements for children of school age is not found for earlier years.

A second characteristic of the model is that it is defined hierarchically. There are two distinct levels for data definition and inferential locus. The individual within the institution defines one level of the hierarchy and the institution another. The hierarchical structure of the model is extremely useful for the study of socialization and change within institutional settings. When socialization occurs within institutions, the policies and characteristics of those institutions influence the important events in the child's

institutional life. Consequently, a full paradigm for institutional socialization must include initial characteristics of the individuals within the institution, subsequent characteristics of those individuals, and characteristics of the institution which are likely to condition and influence socializing experiences. Also, if we are interested in institutional change, we must as well incorporate institutional characteristics at more than one time point.

Characteristics of each level of the hierarchy at the several points in time are the longitudinal basis of the model. Since both kinds of characteristics at early points in time may influence those characteristics at later time points, both levels of the model serve as foci for inference. Nursery schools and day care centers are important examples of socializing institutions to which these models apply.

Previous work in connection with this project has also been concerned with qualitative or categorical data. Murray (1971) formulated a series of statistical models for the analysis of qualitative data with classification errors. Although some of those models were longitudinal, they did not apply to data defined at more than one level in a hierarchy nor do they provide an adequate basis for inferences within the context of such hierarchically structured data.

The models discussed here, are distinct in two ways from the earlier ones. They do not incorporate classification errors while they do incorporate hierarchical data structures, explicitly. It is a module of a larger model which is intended to allow the disentanglement of the effects of institutions such as schools from those of family and prior

characteristics of the children themselves on later characteristics. Eventually, we plan that our general models will incorporate sources of distortion, such as classification error. More research will have to be done, however, before this is possible for hierarchical data structures. In the data set which we have chosen to exemplify the model and the method this omission is not serious. Most of the variables in our example have few such errors. When the model is eventually applied to psychological variables measured at early stages of development, thorough attention will have to be given to measurement error.

The major problem in understanding the processes which produce systematic and substantively interesting changes in individuals and in the institutions within which they act, is not "the measurement of change" but the attribution of change to specific sources. We are not interested in knowing how much an individual or institution changes unless it helps us understand why changes occur. We ask: To what sources can we attribute change? Only such analyses of processes lead to assessments of the consequences of change in the structure of institutions and the treatment of individuals.

The conceptual distinctions among different kinds of change and different components of the general model will be illustrated in the context of the teacher mobility process since the data chosen for illustration of the model come from a study of this process (Harnischfeger, 1973a, b, c, d).

In the following sections of this report, we will in turn discuss:

1) the distinction between structural and compositional change within institutions;

2) the inferential confusion surrounding the mutual confounding of individual characteristics and their later consequences;

3) a specification of a simple additive model allowing disentanglement of the confounding;

4) the illustration and application of a model to data characterizing the mobility process of teachers in elementary schools;

5) the addition of a new model component incorporating the consequences of institutional as well as individual characteristics;

6) the implications of the complete model for the distinction between individual-level and institutional-level influences (this allows the incorporation of the above mentioned compositional-versus-structural-change distinction and the assessment of direct versus indirect--mediated through other variables--influences of specific variables); and

7) the illustration and application of the model to data characterizing institutional influences on the previously analyzed teacher mobility process which allows the full implementation of the model and thus gives an empirical test of the model's utility.

We will be dealing against the background of a process and a data base with the following characteristics:

> Individual teachers teach in specific schools for one or more years. At the end of a particular year they may either remain in that school, transfer to another school, take a leave of absence, or terminate their employment. Thus over a period of time, teachers flow from school to school within the system and outside it. Mobility rates for the district as a whole or a particular school are defined as the proportion of teachers teaching in a particular year who, in a subsequent year fall into one of the mobility categories. The conceptual stance taken toward this process is that the likelihood of these mobility events is influenced by (1) a teacher's personal characteristics, (2) characteristics of the school in which she teaches, and (3) policies of the district which directly facilitate or impede her mobility. The basic data which enter our model include characteristics of teachers, characteristics of schools, and the location, leave status, and employment status of each teacher. All of these are available for several successive years.

1. Structural Versus Compositional Change

Since our mobility data are available for several consecutive years, the rates were calculated for different time intervals (Harnischfeger, 1973, b and d). There was no apparent change over the total period in rates of leave of absence and between-school transfer. However, very strong evidence was found for a decrease in drop-out for newly hired teachers. For the total population of teachers the percentage terminating employment also tended to drop, although the trend was not as dramatic as that for newly hired teachers.

The drops in separation rates are not unambiguously interpretable, however. The question is whether decreases are really due to changes in the separation rates in the sense that a particular kind of teacher is now less prone to terminate employment than earlier; or whether the apparent change is due to the fact that in later years less drop-out prone teachers composed a larger proportion of those employed in the district.

If, for example, younger teachers are more prone to separate than older ones in any year, and if the proportion of younger teachers in the district increases over time, then the average separation rate for all teachers in the district will increase, even though the separation rates for younger and older teachers, separately, do not change. Or, if the percentage of teachers reaching retirement age increases, then this fact would also augment separation without a change in the rates for particular subgroups of teachers. This kind of process, when it is responsible for changes in overall rates, may be termed compositional in that only the proportion of different kinds of teachers in the district has changed.

Another kind of change which would result in modifications in these rates, might be termed structural. This kind of change occurs when the rate for any given group of teachers itself changes. That is, when changes in the overall mobility rates would have occurred even if there had been no change in the composition of the district's teacher population.

If, for example, young teachers tend less to drop-out or if older teachers tend to retire earlier, then this would cause a change in separation rates independent of compositional changes in the teacher population.

2. Causal Confusions: Some Methodological Issues

There are multiple influences on teacher mobility. Some of them are characteristics of the society, the district, the school, the community, and the pupils. Others are personal characteristics of teachers--permanent ones such as sex, progressively changing ones such as age, and modifiable ones such as level of professional education. The influences of these manifold effects are difficult to disentangle. Some go masquerading as others and all are interrelated in a complex network which makes it difficult to decide what factors are responsible for which effects.

For example, when a twenty-nine-year-old teacher with five years of service in the district and a Bachelor's degree takes a leave of absence, which of these characteristics can be assigned responsibility for the leave?

Disentangling these influences is possible but difficult. To illustrate the difficulty, teachers with Bachelor's degrees on the

average, are younger than those with Master's. Younger teachers generally have less teaching experience than older ones. In a group we may find two teachers of the same age with differing degrees. If we find a large enough number in each degree-category, we may compare mobility rates and assess the impact of degree independent of age. We may also find a group of teachers with the same duration of service in a district and subdivide them into various age groups. The discrepancies in the mobility rates for these categories can be attributed to age independent of service. It should be obvious from our examples that with enough individuals of sufficiently varying characteristics. It is possible to at least partially disentangle these influences. The key-consideration in interpreting group-differences in rates, relating to a single individual characteristic, is to take into account that such groups may also vary in other individual characteristics.

The crucial questions concern the separate effects of teacher characteristics, such as sex, age, and teaching experience. Are young, inexperienced, female teachers mobile, because they are young, because they are female, or because each of these characteristics contributes independently to teacher mobility? If the latter is true, then young, inexperienced, male teachers should have an only slightly smaller mobility rate. Older, inexperienced and young experienced female teachers should also have only slightly discrepant rates. If, on the other hand, the major factor in the mobility of these young, inexperienced females, is their youth, then we would expect rather large differences between the mobility rates for these teachers and those

of older teachers regardless of their sex, or experience. These varying patterns of causality, each of which results in high mobility rates for our "high-risk" teachers, have quite different implications.

An example illustrating the confounding seems necessary. In the data to be reported more extensively below, there is a relatively high relationship between teacher-age and years of teaching experience in the 1969/70 school year (Table 1). In fact, there are no teachers older than fifty-three with less than two years of teaching experience and none with more than nine years of experience who are under thirty.

Table 1 Teacher Separation for Various Combinations of Ages and Years of Teaching Experience

	Years of Teaching Experience							
	0 to 1		2 to 9		10 or more		Total	
Age	Separation Rate	Total Number of Teachers	Separation Rate	Total Number of Teachers	Separation Rate	Total Number of Teachers	Separation Rate	Total Number of Teachers
22-29	26.3	114	18.9	185	–	0	21.7	299
30-53	16.7	12	10.4	278	2.0	101	8.4	391
54-65	–	0	30.8	26	25.0	56	26.8	82
Total	21.4	126	14.7	489	10.2	157	15.4	772
Predicted Total	20.4		14.4		15.0			

Teacher separation rates show an expectable pattern with age: Teachers under thirty have a high separation rate regardless of their teaching experience; those between thirty and fifty-three are distinguished by a low rate, and older teachers have a high separation rate due to retirement. The pattern for years of teaching experience is one of continual lowering of separation rates.

However, a distortion of the total pattern for experience is obvious (Table 1, row labeled "Total"). To illustrate: For teachers under thirty the discrepancy between beginning teachers (0-1) and more experienced (2-9) is 7.4 percent; for teachers between thirty and fifty-three the same discrepancy is 6.3 percent. The discrepancy in the total rates of separation, however, is 10.7 percent--larger than each of the age-specific ones. This bias is clearly due to the fact that most (over 90%) of the beginning teachers (0-1) are in the youngest

age group, while of the more experienced ones (2-9), most (57%) are between thirty and fifty-three years old. This implies that the discrepancy in total separation rates for these two experience-groups includes effects of age as well as teaching experience. In this case the effects of age and experience are in the same direction so the results are cumulative.

On the other hand, if we compare the separation rates for the most experienced teachers with those who have between two and nine years of teaching experience, we find that, for the total population, the discrepancy is 4.5 percent, whereas, the discrepancies are 8.4 and 5.8 percent for teachers between thirty and fifty-three and older ones, respectively. We can again see why this is the case. For teachers with between two and nine years of teaching experience only five percent are in the oldest age group whereas for the most experienced thirty-six percent are in that group. Since the separation rate is highest for the oldest group, this raises the average separation rate for the most experienced group beyond the actual effect of experience. In this case, the effect of age and that of experience are in opposite directions thus forcing the separation rate difference between the two groups to seem small.

We can quantify the extent of this bias by projecting the apparent separation rates for each of the experience groups as if they were solely due to differences between age groups. The next-to-last column in the table reports the average separation rates for each age group. We may form a weighted average of these rates based on the cell frequencies for each experience level and thus predict what the separation rate would be for each such level if all differences were solely due to age effects. The last row in the table reports the predicted rates for each of the age categories based on this presumption. For example, the weighted average for the first experience category is $[(114)(21.7) + (12)(8.4)]/126 = 20.4$. We expect, due to the age effect and the positive relation between age and experience, a six-point difference between the first two experience categories. The total separation rates, without adjustment, may be extremely misleading indices of the effects of certain teacher characteristics.

This problem of bias requires a solution. We are in need of a method of adjustment or correction which will accurately reflect differences in mobility rates between types of teachers (e.g., older or younger) when other teacher characteristics (e.g., experience, sex)

are identical for each type compared. Such an adjustment can only be accomplished if we have an unambiguous conception of the relations between teacher characteristics and teacher mobility. More concretely, for the analysis we must posit a statistical model which accurately reflects these relations.

3. An Additive Model for Individual-Level Qualitative Data

In the model we have formulated, the observed mobility rate for a given type of teacher (e.g., a young, inexperienced female) is the sum of separate effects for each of the characteristics defining the teacher type (i.e., age, experience, sex).

For our model we created categories for each of six teacher-characteristic variables. The final categorization of variables was based on a series of preliminary tabulations exploring the relations of more refined categories to teacher mobility. Levels were grouped according to similarities in mobility rates. The categories created for each variable were mutually exclusive and exhaustive. For age, degree held, sex, years of teaching experience (salary step), professional education (salary class), and length of service in the district, there were 5, 2, 2, 6, 5, and 8 categories, respectively. The definitions of the categories are given in the labels of subsequent tables. Years of teaching experience was defined as the salary-step number minus one. The salary-class categories range from A.B. to A.B. with 60 semester graduate units (Harnischfeger, 1973, b, p. 16). The teacher mobility concept was divided into four categories: separation, leave of absence, transfer, and stay. A teacher was defined as a classroom teacher teaching in an elementary school at least half-time during the base year of the mobility comparison. The mobility categories were defined according to the teacher's status in the terminal year of the comparison. The status for separation is: teacher is no longer employed in the district. The status for leave of absence is: teacher is employed in the district but is not teaching. The status for transfer is: teacher is teaching in the district but in a differenct school. The status for stay is: teacher is teaching in the same school during the terminal as in the base year.

For the model, each of the above categories was coded as a dichotomous variable: equal to "1" when the teacher was in that category and "0" when she was not.

Since in each mutually exclusive and exhaustive category system the dichotomous variable for the final category is equal to one minus the sum of the dichotomous variables for the other categories, it is redundant. The redundant variables were omitted from model specification. Consequently three models were formulated: separation, leave of absence, and transfer.

In each of our models, the particular dichotomous variable to be explained, was conceived as the sum of a constant term and the several products of the dichotomous variables and effect-coefficients for each of the teacher-characteristic categories. In symbolic terms:

$$y = \alpha + \sum_{i=1}^{n} \beta_i x_i + \epsilon \quad ,$$

where y represents the outcome, the x_i the individual characteristic variables, n the number of such variables, α the constant term, the β_i the effect-coefficients, and ϵ a discrepancy or error.

For example, the difference in expected mobility rate between an old, experienced female teacher and an old experienced male teacher is solely due to the expected effect of sex.

Such a model simulates reality in a way that the observed differences in composition of specific groups are reflected in the expected mobility rates. If male teachers, on the average, are older, and have more teaching experience than females, the difference in expected mobility rates between these groups will reflect the effects of age and teaching experiences as well as that of sex. So, the model distinguishes between the effect of a single individual characteristic--female--and the expected rate for a concrete group of individuals--females--which in an actual institutional setting has a specific distribution of other individual characteristics.

If we are able to determine the effect of a single characteristic independent of others, then we will have solved the problem of bias. The adjustment process then consists of separately estimating the additive "effects" of each characteristic.

Models are approximations--hopefully useful--to reality. Our particular model allows us to "average" the differences between groups over a large variety of equated distributions of characteristics. With respect to two groups, e.g., males and females, we, in effect, average the differences in rates for other combinations of characteristics, e.g., inexperienced young teachers, inexperienced old teachers, experienced young teachers, and experienced old teachers. This gives us an "average effect" for one characteristic when other characteristics are identical. The estimation of these effects allows us to project mobility rates for particular types of individuals with any specific distribution of characteristics. These we call adjusted rates.

The coefficients in the model specified above are the effects to be estimated. The estimation was accomplished by subjecting our data to ordinary regression analysis using this model. The estimated coefficients resulting from the analysis formed the basis for all subsequent calculations.

Adjusted mobility rates are derived from the estimated effects and a particular set of equated characteristics. In all cases the characteristics selected for equation were those of the "average teacher".

Each coefficient in the regression analysis is interpretable as an effect corresponding to the difference in mobility between the category corresponding to the omitted variable in its set. Consequently, the adjusted rate for a particular category was computed by adding a constant value to each of the coefficients of the variables in a

particular set. The coefficient value assigned to the missing variable was zero. The constant was chosen so that the mean adjusted mobility rate for the total population equaled the appropriate value. The appropriate value in any specific case was the adjusted total mobility rates produced using the results of the regression analyses according to the following rationale.

The basic principle in comparing teacher mobility rates in different periods is to separate the differences into those attributable to changes in the composition of the district's teacher population, on the one hand, and those due to structural changes in the district, on the other.

We may accomplish this differentiation by predicting the mobility rates in each of the intervals as if their composition was that of the initial year. The differences among these sets of predicted values are due to structual changes in the district, since they are biased on a single composition of the teacher population. The discrepancies between these predicted values and the actual values reflect compositional discrepancies among teacher populations in the differenct years.

We may produce the values, adjusted for composition, by applying the regression weights in the population to be adjusted to the means of the variables in the criterion population. The constant term plus the sum of products of the means and the coefficients will produce the adjusted mean for the outcome variable. This is a direct standardization procedure (Wiley, 1973).

4. An Illustration of the Model

As we explained in the last section, it is difficult to unambiguously interpret the observed relation between a characteristic and a potential consequence, when the particular characteristic and others are interrelated. Such interrelations force us to adjust. The stronger the relationship between two characteristics, the more indispensable the adjustment and, in general, the greater the degree of adjustment. Consequently, it is important to assess these interrelations in order to understand the various causes of an adjustment and their relative impact. This understanding is a prerequisite for sensitve and detailed interpretation of the adjusted effects. It is impossible to judge the validity of an adjustment if one does not undertand the reasons for its occurence.

> The teacher characteristics which we are assessing in this report are indeed highly related. There is a direct, almost definitional, relation of age to each of the other teacher characteristics we have considered, except sex. It is, for example, impossible to acquire teaching experience or the closely related quantity, years of service in the district, without aging. An examination of the teachers' average ages for the various years-of-teaching-experience categories reveals a steady increase from an average teacher-age of twenty-eight for beginning teachers to an average of forty-nine years for teachers with ten or more years of teaching experience. The same pattern exists for "length of service". The mean age increases from twenty-nine years for no prior service to fifty-five years for twenty or more years of service in the district. A similar picture is also reflected in the relation of age to professional education where the mean age increases from thirty-one to forty-three years from the lowest to the highest level. A closely related variable is "degree held". Teachers with Master's degrees average forty-one years while those with Bachelor's degrees are typically five years younger. Both relations are expected since more education requires more time.

Even males and females have dramatically different age distributions. Almost forty percent of the females are under thirty while only a little more than twenty percent of the males fall in this age category. However, the age-means for males and females are almost the same because of balancing discrepancies in the age distributions. For example, eleven percent of the females but no males are over fifty-three.

The closest relation among the variables is that between length of service and teaching experience. We expect this because the only likely discrepancies between these variables are due to inter-district transfer and leaves of absence. The distributions of years of service for males and females are similar to those of age. Finally, there is a relation between sex of teacher and the degrees teachers hold in that thirty-seven percent of the male teachers hold Master's degrees compared to only fourteen percent of the females.

All of these findings illustrate the pervasive and forceful interconnections among these variables, both conceptually and empirically. They presage large effects of variable adjustment. In our discussion of the determinants of teacher mobility, interpretations will be based on the adjusted mobility rates of the various teacher characteristics for the several time-periods. The results of the adjustment process for the teacher mobility rates were reported in Harnischfeger (1973, c). These adjustments are exemplified here by Tables 2 through 7. These tables display the results for transfer only and illustrate the application of the model.

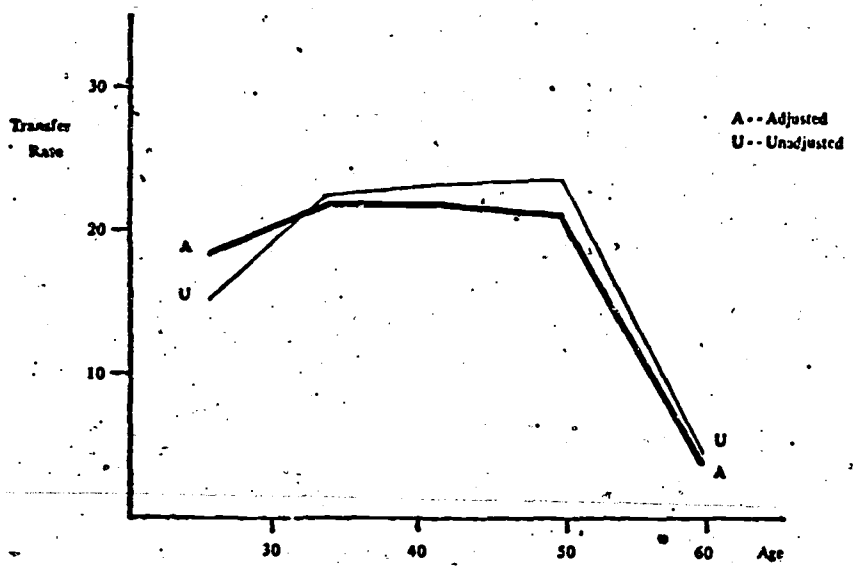
Age has a noticeable impact on teacher transfer between schools. The general pattern here, both before and after adjustment, is a moderate transfer rate for the youngest age group, a uniformly higher transfer rate for teachers between thirty and fifty-three and a very low transfer rate for the oldest age group (Figure 1, Table 2). The only effect

Table 2. Trends in Teacher Transfer by Age of Teacher, Adjusted for Other Teacher Characteristics

	Transfer Rates,						
	1 Year			2 Years		3 Years	
Age	68-69	69-70	70-71	68-70	69-71	68-71 Adjusted	68-71 Unadjusted
22-29	7.5	9.0	6.7	17.0	13.4	18.5	15.2
30-37	6.0	13.2	10.1	17.6	17.6	21.7	22.4
38-45	8.8	7.5	9.3	16.7	15.1	21.8	23.3
46-53	7.5	7.9	9.5	12.7	17.6	21.1	23.6
54-65	4.7	0.6	3.3	2.6	2.1	3.8	4.3

of adjustment is to make the discrepancy between the youngest and the middle aged groups much smaller by raising the younger transfer rates

Figure 1 Adjusted and Unadjusted Transfer Rates for Teacher Age



By about three percent and decreasing those of the middle-aged by about one and one-half percent. This is probably due to the fact that the transfer rates are influenced by seniority. The change reflects adjustment for lengtn of service. This trend, however, is only apparent for the 1971/72 school year. Except for some fluctuation which could easily be random, transfer in other school years does not systematically differ among any age groups except the last.

There are no consistent trends, either before or after adjustment, in the transfer rates for amount of teaching experience. The rates, for the three-year time interval, vary from eleven to twenty-five percent in a highly irregular pattern after adjustment (Table 3).

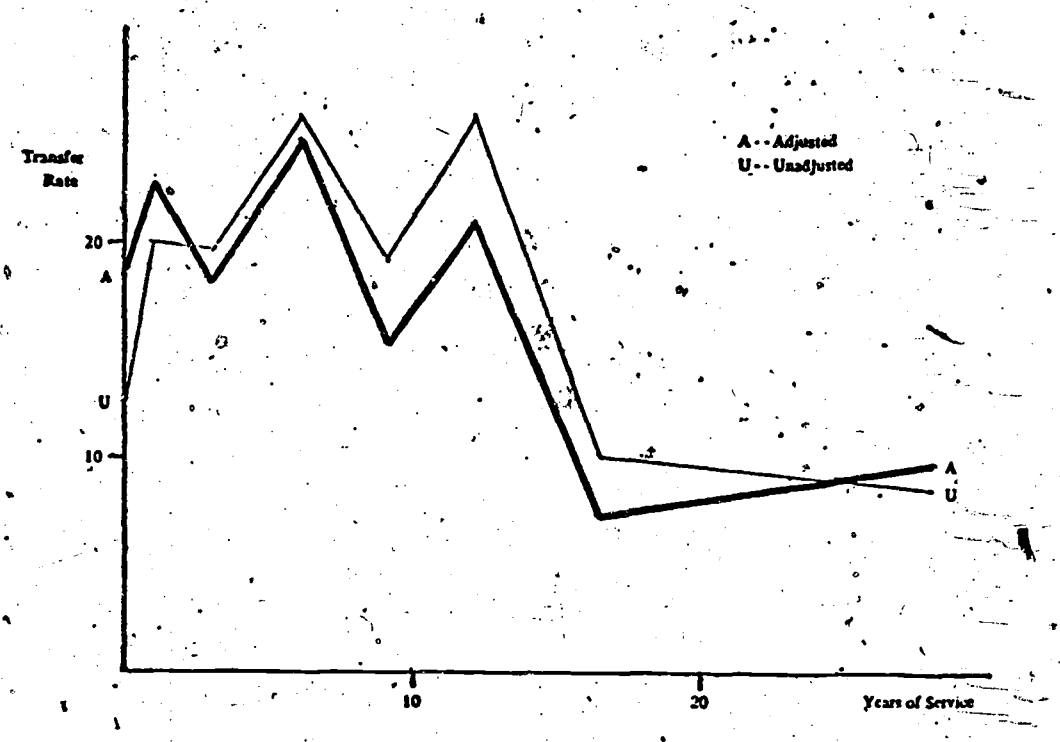
Table 3. Trends in Teacher Transfer by Years of Teaching Experience (Salary Step), Adjusted for Other Teacher Characteristics

Years of Teaching Experience	Transfer Rates						
	1 Year			2 Years		3 Years	
	68-69	69-70	70-71	68-70	69-71	68-71 Adjusted	68-71 Unadjusted
0-1	-.6*	11.4	3.8	8.1	14.6	10.6	11.4
2-3	1.6	7.3	5.0	16.8	11.0	21.3	21.1
4-5	8.5	8.9	12.3	15.0	16.0	13.7	15.0
6-7	6.7	6.7	6.1	15.7	6.6	21.1	23.1
8-9	14.7	7.7	12.0	17.8	13.9	17.9	15.1
10-	11.3	9.0	7.7	16.9	19.2	25.0	22.0

* The negative value occurs because an ordinary additive regression model was used to fit a dichotomous (0,1) dependent variable.

The duration of employment of a teacher strongly influences her likelihood of transfer (Figure 2, Table 4). Prior to adjustment, the rate is lowest for newly hired teachers and higher for those with one year of service, fluctuates for teachers with two to thirteen years of service, and drops thereafter. After adjustment, the initial increase disappears reflecting no systematic trend in transfer rates

Figure 2 Adjusted and Unadjusted Transfer Rates for Length of Service in the District



through thirteen years of service. The subsequent decrease in transfer, however, is not eliminated by the adjustment. There are some differences between time-periods. However, the consistent results are the lower transfer rates for teachers who are employed by the district for more than thirteen years. These rates are half of those of teachers with less years of service which possibly reflects the

Table 4. Trends in Teacher Transfer by Length of Service of Teacher, Adjusted for Other Teacher Characteristics

	Transfer Rates						
	1 Year			2 Years		3 Years	
Years of Service	68-69	69-70	70-71	68-70	69-71	68-71 Adjusted	68-71 Unadjusted
0	10.0	3.1	9.4	16.5	7.1	18.8	12.9
1	17.7	5.5	4.8	20.4	12.2	22.7	20.0
2- 4	7.8	10.4	6.9	14.3	18.7	18.2	19.8
5- 7	7.1	7.4	10.0	12.7	15.7	24.9	25.5
8-10	1.9	12.8	8.0	18.1	19.3	15.4	19.3
11-13	3.7	16.6	9.1	20.7	13.4	20.7	25.9
14-19	-3.3*	10.6	5.4	6.4	10.9	7.3	10.0
20-	-4.6*	9.9	12.0	10.7	10.4	9.9	8.4

* The negative value occurs because an ordinary additive regression model was used to fit a dichotomous (0,1) dependent variable.

fact that after a teacher has been teaching in a single district for more than thirteen years, she has likely found a school with which she is satisfied.

Transfer is also substantially influenced by the teacher's level of professional education, although there is only a small effect of the adjustment (Figure 3, Table 5). The transfer rates are relatively uniform for teachers with up to fifty-nine semester graduate units beyond the minimum credentials (A, B, C, D) and considerably higher for teachers with at least sixty such units. This trend is apparent for all time-periods except one (1968/69-1969/70), where no systematic effects are apparent after adjustment. There are

Figure 3 Adjusted and Unadjusted Transfer Rates for Professional Education of Teacher (Salary Class)

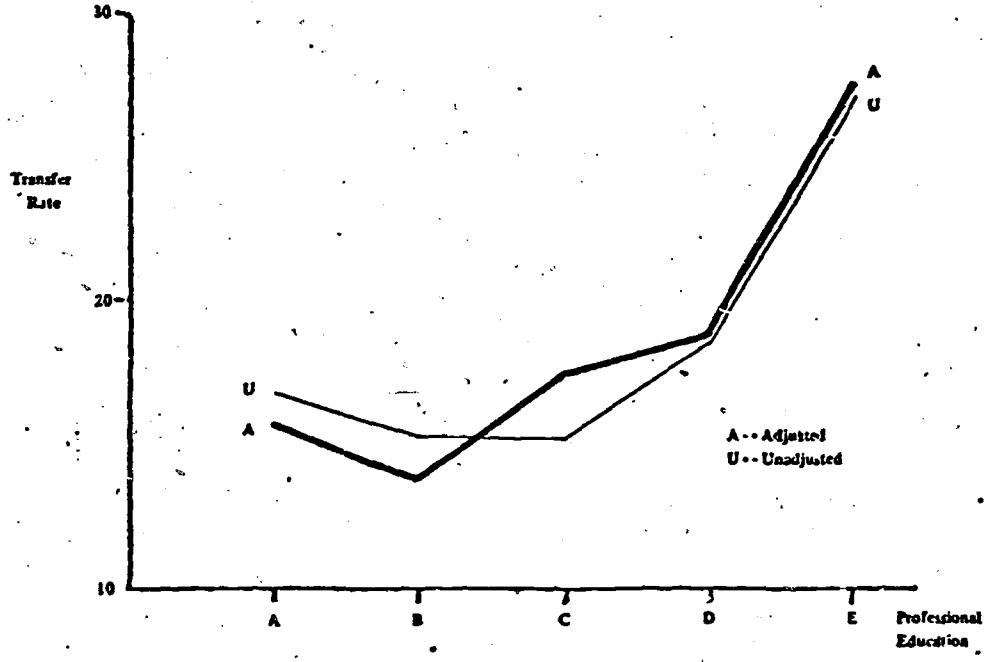


Table 5. Trends in Teacher Transfer by Professional Education of Teacher (Salary Class), Adjusted for Other Teacher Characteristics

Professional Education	Transfer Rates						
	1 Year			2 Years		3 Years	
	68-69	69-70	70-71	68-70	69-71	68-71	
						Adjusted	Unadjusted
A	8.1	4.9	5.5	8.9	10.0	15.8	16.7
B	7.1	8.4	8.1	13.9	14.1	13.6	15.2
C	4.9	5.6	7.9	9.2	14.5	17.6	15.2
D	9.2	10.9	6.5	18.5	14.1	18.4	18.6
E	7.3	14.3	10.6	26.5	16.7	27.5	27.1

two distinct interpretations of these results: (1) Since promotion is categorized with transfer in these data, it may reflect the greater promotion rate for the highest level of professional education; (2) the pattern may also reflect a preference in district policy allowing more freedom of transfer to those teachers who have sought to improve themselves with additional professional education.

There is a difference in the amount of transfer between teachers with Master's and Bachelor's degrees (Table 6). Unadjusted transfer rates are higher for those with Master's degrees. After adjustment, their rates are lower. Recalling that transfer rates are higher for the middle-aged teacher groups, we can see the explanation. As holders of Master's degrees tend to be in these age groups, while holders of Bachelor's degrees are younger, this makes it appear, before adjustment, that the teachers with Master's degrees have higher transfer rates. Actually, however, after adjustment, these teachers are really more stable in their school affiliations than those with Bachelor's degrees.

This explanation holds only for a longer (three-year) time-period. For shorter time-periods, adjusted rates are higher for Master's than for Bachelor's degree holders. The reason that the three-year pattern reflects greater stability for teachers with Master's degrees is that holders of Bachelor's degrees tend to transfer more than once during the three-year period even though their likelihood of transfer is less between adjacent school years. Consequently, we expect more

Table 6. Trends in Teacher Transfer by Degree Held, Adjusted for Other Teacher Characteristics

	Transfer Rates						
	1 Year			2 Years		3 Years	
	68-69	69-70	70-71	68-70	69-71	68-71 Adjusted	68-71 Unadjusted
B.A.	6.3	8.1	7.6	14.8	13.5	19.1	17.4
M.A.	11.5	10.9	8.8	16.5	15.7	15.6	22.7

short-term stability from teachers with Bachelor's degrees and more long-term stability from teachers with a Master's degree. There is a systematic and consistent difference in the amount of transfer between male and female teachers (Table 7). Before adjustment the transfer rate for males is almost four percent higher than that for females. However, after adjustment the transfer rate for females is over two percent higher than that for males. This reflects the fact that many more male than female teachers in the district are over thirty and that they also have, on the average, higher degrees as well as more teaching experience. The value difference between the rates for male and female teachers is, however, minor after adjustment.

In summary, the pattern of influence of teacher characteristics on transfer between schools is varied. Length of service in the district has the largest effect. This indicates that seniority plays the major role in inner-district transfers. It is followed by teacher age and professional education in size of effect. Sex of teacher and degrees teachers hold, have small but uniform influences. Teaching experience, independent of seniority, has no consistent impact on teacher transfer.

The important result is that different types of teachers leave schools at different rates, independent of the characteristics of the school at which they teach. By not considering this result, the basic finding of school to school variation in mobility would tempt us to directly attribute this variation to differences in the characteristics of schools. The difference in teacher drop-out between low-income and middle-class schools would then be attributed

Table 7. Trends in Teacher Transfer by Sex of Teacher, Adjusted for Other Teacher Characteristics

	Transfer Rates						
	1 Year			2 Years		3 Years	
	68-69	69-70	70-71	68-70	69-71	68-71 Adjusted	68-71 Unadjusted
Male	6.2	3.1	8.2	9.5	12.7	16.6	21.6
Female	7.3	9.1	7.8	15.7	14.0	18.7	17.9

to differences in socio-economic status of the schools' student bodies.

What is not taken into account in such common attributions is that schools not only differ in such characteristics but also in the compositions of their teaching staffs. Thus, since different kinds of teachers leave with different frequencies, it is problematic whether differences among schools can be directly attributed to differences in general school characteristics or to differences in teaching-staff compositions.

In general, we do expect variations in teacher mobility among schools which are not direct consequences of general school characteristics. More concretely, it is commonly asserted that low-income, low socio-economic-status schools have larger proportions of young and inexperienced teachers. If this is true, then the higher mobility rates in these schools could be due to either (1) differences in pupil population served and consequent differences in school atmosphere--which might discourage a teacher by making her feel insecure and inefficient--or (2) the fact that the teaching staffs allocated to these schools are composed of more young, beginning, mobility-prone teachers.

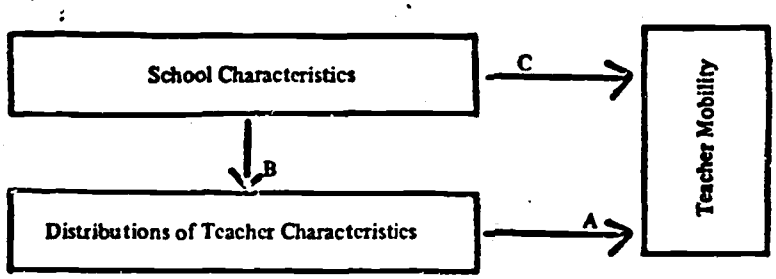
If the differences in mobility are more directly due to differences in the socio-economic composition of the student body served, then policy actions taken to increase teaching-staff stability must either change these compositions (e.g., via busing) or change the atmosphere of the school directly. If variations in mobility are

directly due to differences in the mobility propensities of certain types of teachers, then policy actions might well change the school assignment and transfer regulations of the district. Our analysis of mobility variations among schools must reflect the extent to which these differences flow from either the kinds of teachers assigned to the schools or from direct influences of the characteristics of such schools on the mobility process.

5. The Model at the Institutional Level

A simple model (Figure 4) depicts our conception of these two distinct processes influencing teacher mobility. We consider three components of the model, school characteristics, teaching-staff composition (distribution of teacher characteristics), and teacher mobility. The arrow labeled A links the types of teacher assigned to a particular school with the extent of teacher mobility in that school. This linkage symbolized the relations between a school's teaching-staff characteristics and its mobility. The earlier model may be thought of as fully articulating link A for individual teachers. Here we will use those results to characterize the school linkage by estimating a staff-composition mobility-propensity for each school. This will be accomplished by "averaging" the expected mobility rates for the particular teachers in each school. This process will be described in more detail below.

Figure 4. Conceptual Submodel for the Impact of School and Teacher Characteristics on Teacher Mobility (School Level)



The major purpose here is to distinguish effects on mobility via linkage A from those caused through linkage C, which symbolizes the direct impact of school characteristics on teacher mobility. This task is impeded by the existence of link B which stands for the fact that schools with different characteristics are allocated different types of teachers. For example, schools with large numbers of pupils from ethnic minority groups may receive more teachers from these groups than schools with predominantly white middle-class pupils. The processes represented by the link B result in quite different teaching-staff compositions in different schools. If these compositional differences systematically result in differences in teacher mobility, and this is not taken into account, such differences may masquerade as direct effects of school characteristics.

We will attempt to describe both (1) the relations between school characteristics and the kinds of teachers assigned to schools--a resource allocation problem--and (2) the direct relations between school characteristics and teacher mobility. A detailed description of the school characteristics which we use in our model may be found in Harnischfeger (1973, d).

In our analysis of the effects of personal teacher characteristics on teacher mobility (Section 4), we explicitly defined six different sets of such characteristics which we incorporated into our model of the mobility process: age and sex of teacher, years of teaching experience, length of service in the district, level of professional education, and academic degree held. These variables were, in our illustration, related to transfer between schools.

The determination of the separate effects of single teacher characteristics was complexified by the fact that these characteristics are highly interrelated. These interrelations effect confounded or spurious estimates of the potency of individual teacher characteristics when they are not considered in the assessment of the influences of individual such characteristics. We described the effects of teacher characteristics without the confounding influences of related variables; estimates were adjusted on the basis of an anlytical model for the mobility process. Both adjusted and unadjusted effects of individual characteristics were presented.

The procedures used in conjunction with the analytic model allow a simulation of the mobility process. We can predict a teacher's

mobility on the basis of her personal characteristics. This estimated probability expresses the likelihood that a teacher, within a specified time period, will take a leave of absence, transfer to another school, terminate employement, or stay where she is. These predictions can be made for each teacher in each school in the district. We thus may obtain a set of individually predicted mobility propensities for every school. The school average of these is an index of the likelihood that a typical teacher in a particular school will leave in a specified time period. This may be interpreted as the expected proportion of teachers taking leaves of absence, transferring, terminating employment, or staying in a school, i.e., the expected mobility propensities of a school. These propensity values reflect differences in the compositions of the schools' teaching staffs. They reflect, however, only those differences among teachers which are relevant to, that is, affect teacher mobility.

These propensities are, of course, determined on the basis of actual teacher mobility. We, therefore, calculate the schools' actual mobility rates, i.e., the proportions of teachers in a specified period who do take leaves of absence, who do transfer to another school, who do terminate employment, and who do stay at a specific school. These rates, for a two-year period (1969/70 to 1971/72), constitute the explicans of the institutional-level model, although we only illustrate it for transfer.

Our model of the mobility process (Figure 4) postulated the determination of teacher mobility by two factors: school characteristics and teaching-staff compositions. The predicted mobility rates

(propensities) summarize the mobility-relevant aspects of the schools' staff compositions with respect to: age and sex of teacher, teaching experience, length of service in the district, academic degree, and level of professional education. Further, the teaching staffs were characterized by their teachers' racial-ethnic group-memberships. This results in four variables representing teaching-staff composition, three of which are mobility predictions: leave of absence propensity, transfer propensity, and separation propensity; the fourth is percent non-minority teachers.

If we had analyzed teacher mobility without incorporating these aspects of teaching-staff composition, we would have attributed a part of the teacher-characteristic effects to the general school characteristics which are correlated with them. With our data, however, this mis-attribution would have resulted in only small biases in our estimates of the influences of school characteristics on teacher mobility, because correlations between the mobility predictions for teaching staffs and the characteristics of schools are small. By accounting for this relation, we eliminate, of course, even the small bias which does exist.[1] The systematic relations of predicted and actual mobility rates are, however, also helpful to us. They imply that we can increase the precision of our estimates of the school-characteristic effects by including these propensities in our assessments. The increase in

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[1] By bias we mean consistent under- or over-estimation of a variable's effect. This may be contrasted with imprecision, which means inaccurate estimation, but without consistency. Both contribute to overall accuracy.

precision results because the inclusion of additional explanatory variables in a regression analysis, when they influence the variable to be explained, reduces the magnitudes of the standard errors of the estimated coefficients. This reduction occurs because these standard errors are proportional to the square root of the unexplained variance, which diminishes as more influences are included. To assess the effects of school characteristics on teacher mobility, we must form an analytic version of our conceptual model. This version must specify relations between actual mobility rates, on the one hand, and concrete school-characteristic and staff-composition variables, on the other.

Since there are three basic mobility rates: leave of absence, separation, and transfer, we could specify three distinct models.[2] For illustration we have chosen to explicitly specify only the model for transfer as an additive, linear regression model, which includes school size, percent Spanish surname pupils, and percent free lunch, a socio-economic-student-body index, as explanatory school characteristics. Percent minority teachers and the relevant propensity measure are also included to account for differences among teaching staffs.

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[2] The rate at which teachers stay at a school is complementary to mobility. Consequently, the determinants of leave of absence, transfer, and separation are also determinants of stay. This implies that the results of the regression analyses for the three separate mobility rates can be summarized to explain the stay rate. The details of this process are discussed in Footnote 3.

The model may be specified by:

$$Y_i = \alpha + \beta_1 x + \beta_2 y_i^* + \gamma_1 z_1 + \gamma_2 z_2 + \gamma_3 z_3 + \varepsilon_i \ ,$$

where Y_i and y_i^* represent the mobility rate (transfer) and its propensity, respectively; x represents percent non-minority teachers, and the z's the three school characteristics. The Greek letters are coefficients representing the influences of the variables on mobility. The estimates of these coefficients will form the basis for our interpretations.

The three time spans available in our data (1969/70-1970/71, 1970/71-1971/72, and 1969/70-1971/72) together with the three aspects of mobility imply nine distinct regression analyses, the results of which are reported in Table 8. The complement of these mobility rates, the rate at which teachers stay in a particular school, forms a distinct heading in the table.[3]

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[3] Stay rates are equal to one hundred minus the percentage rates for leave of absence, transfer, and separation. Since each of the three basic regressions includes the predicted value (propensity) for that mobility rate, the corresponding regression for stay would have included this also. Stay is the complement of mobility. Consequently, its regression coefficients could have been directly calculated from those of transfer, leave of absence, and separation, if the explanatory variables in these three regressions had been identical. In this case, the coefficients for stay would have been the negative of the sum of the three coefficients from the other regressions.

Unfortunately, these explanatory variables differ among the three regressions: The propensity measures for transfer, leave of absence, and separation are different variables. We may proceed, however, if we assume that the propensity measure for a specific mobility summarizes all of the influences on that rate of the teacher characteristics which make it up. Then, we can approximate the appropriate coefficients using the above calculation. This we did.

The standard errors of those coefficients can also be approximated. We can compute what they would have been, if each of the mobility propensities had been separately included in the regression, in place of the stay propensity. This was done. The standard error values, for stay, in the table are always the largest of the three computed.

Table 8. Results of School-level Regression Analyses

Independent Variable		Teacher Mobility											
		Leave of Absence			Separation			Transfer			Stay*		
		69-70	70-71	69-71	69-70	70-71	69-71	69-70	70-71	69-71	69-70	70-71	69-71
(1) Pupil Enrollment (ln)	Coeff.	.00857	.01191	-.00933	.03542	-.01163	.02184	.00231	-.08897	-.06037	-.04630	.08869	.04786
	Std. Error	.02415	.01994	.02704	.02769	.03039	.04078	.03942	.03906	.04775	.05969	.05860	.07609
(2) Percent Pupils Receiving Free Lunch	Coeff.	-.04711	-.00021	-.35222	.06213	-.11533	-.22261	-.40560	-.09311	-.44271	.39058	.20800	1.01754
	Std. Error	.21869	.11799	.23939	.24617	.18466	.37414	.36003	.23205	.43144	.54048	.35608	.69807
(3) Percent Pupils with Spanish Surname	Coeff.	-.02062	-.06933	-.01334	-.01127	.08077	.06484	.29668	.21178	.41348	-.26479	-.22322	-.46498
	Std. Error	.04592	.09076	.05003	.05026	.13884	.07713	.07431	.17682	.09005	.11349	.26773	.14391
(4) Percent Non-minority Teachers	Coeff.	.17421	-.28580	-.22863	-.07931	-.10668	-.00835	.53931	.12924	.79922	-.63421	.26324	-.56224
	Std. Error	.15253	.14354	.16774	.17050	.22007	.25935	.25233	.28342	.30248	.37697	.42438	.48389
Aggregated Teacher Characteristics (Control Variable)	Coeff.	.19716	1.48101	1.67331	.92886	1.45093	1.18880	.95231	2.27933	1.89116			
	Std. Error	.72021	.46049	.55243	.48218	.83612	.48352	.88493	1.20962	.82128			
Intercept	Coeff.	-.17072	.15956	.22489	-.15620	.13325	-.17160	-.57516	.31945	-.56136	1.90208	.38574	1.50807
Standard Error of Estimate		.05572	.04887	.06091	.06139	.07505	.09420	.09057	.09595	.10983			
Multiple Correlation		.3712	.6138	.5699	.5080	.3955	.4962	.6524	.6310	.7595			
F-ratio		.7990	3.2636	2.4054	1.7390	1.0011	1.6335	3.7055	3.5725	6.8161			
SD of Dependent Variable		.05478	.05686	.06767	.06506	.07506	.09905	.10909	.11361	.15413	.13539	.14474	.18481
Mean of Dependent Variable		.04087	.05173	.05310	.06626	.08921	.15819	.07977	.09233	.14461	.81310	.76673	.64410

* See Footnote 11) in the text.

We found earlier (Section 4), that a teacher's seniority in the district, her age, and her professional education are major determinants of teacher transfer. The teachers with the highest transfer rates are those between thirty and fifty-three with high levels of professional training. From the current analysis, another teacher-characteristic effect is apparent. Non-minority teachers had considerably higher transfer rates than minority teachers between 1969/70 and 1970/71. But while non-minority teachers transferred in the subsequent period at about the same rate, we found a large increase in transfer for teachers of minority groups. This might indicate that district policies changed, favoring minority teachers.

Transfer is strongly influenced by teaching environments as well as the characteristics of teachers themselves. The more recent transfer (1970/71-1971/72), is influenced by school size. Large schools seem to have lower transfer rates than small schools. This effect is consistent with the hypothesis that teachers have an easier time finding a satisfactory work setting in a larger school. This advantage could even have been increased by decreasing elementary school enrollment which may affect smaller, less flexible schools more than large ones.

For two schools with similar teaching staffs, the difference in percentage of teachers transferring, is largely dependent on the schools' percentages of Spanish heritage pupils. As this characteristic strongly reflects the socio-economic status of a school's student body, we can infer that low-income schools suffer from large transfer rates. This relation is consistently obvious over the whole time

period, although it is not precisely determined in 1970/71 to 1971/72, because of the high correlation between the Spanish surname and free lunch variables. The precision decreased so greatly that the effects of these variables are not really differentiable.[4] In the earlier time period, the free lunch variable was only weakly related to Spanish surname. This allowed more precise estimation of the influences of socio-economic status of a student body on transfer behavior of teachers.

Analyzing transfer between 1969/70 and 1971/72, we find that percent Spanish surname pupils has, by far, the largest variable-effect encountered in the study. The difference in transfer rate between otherwise similar schools and teaching staffs, which differ greatly in their pupil ethnic compositions, can be more than thirty percent. For example, a school with five percent Spanish surname pupils, but with a typical teaching staff, has only a three percent transfer rate. While, an otherwise similar school with seventy-five percent such pupils, has a thirty-two percent rate. These figures were calculated in the following fashion.

When all variables but percent Spanish surname pupils are held constant, the relation between transfer rate and this variable is a

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[4] The standard errors of the coefficients increased by a factor of two and one-half. This decrease in precision, accompanying high inter-correlations of explanatory variables in regression analyses, is a result of what is called the problem of multi-collinearity. When these interrelations increase, the standard errors of the estimates of the coefficients from the regression analysis also increase. When these relations are relatively close, the resulting precision is sometimes low enough to mask very large effects.

simple linear one: $y = \mu + \beta x + \varepsilon$, where y represents transfer rate, x percent Spanish surname, β the regression coefficient, ε the error, and μ the constant term together with the constant influences of the other variables. This implies that $\bar{y} = \mu + \beta\bar{x}$; i.e., the mean transfer rate is a constant plus the product of the regression coefficient and the mean percent Spanish surname. The transfer (1969/70-1971/72) regression coefficient for percent Spanish surname pupils is 0.4135. Since the mean percent Spanish surname pupils in 1969/70 is 31.83, the mean transfer rate for 1969/70 to 1971/72, which is 14.46, is equal to the constant plus (.4135)(31.83). Therefore, the constant equals 14.46 minus (.4135)(31.83) or 1.29.

From the above model, an expected transfer rate for a school with a specified percent of Spanish surname pupils, x^*, is $\mu + \beta x^*$. Consequently, the expected transfer rates for our two hypothetical schools (5% and 75% Spanish surname pupils) are 1.29 plus (.4135)(5) and 1.29 plus (.4135)(75) or 3.36 and 32.30, respectively.

One of the most explicit mobility hypothesis in the literature specifies that teachers in low-income schools seek to and do transfer to schools whose pupils are of higher socio-economic status (Becker, 1952). Until now, there has been no convincing evidence on this point. Prior studies, when they presented relevant findings, never clearly accounted for the contaminating effects of teaching-staff composition. In our case, this is extremely important because: (1) Percent Spanish surname pupils influences the allocation of

teachers from different racial-ethnic groups, and (2) the racial-ethnic groups of a teacher influences her mobility. These two links result in a strong chain connecting percent Spanish surname pupils and teacher transfer only via differences in staff composition.

We cannot, at this point, fully answer the question, what kinds of teachers in a low-income school are especially transfer-prone, because the current version of our model does not allow interaction between teacher and school characteristics. However, we do know that, in general, non-minority teachers have higher transfer rates. We also know that minority teachers' transfer has increased, and that they are dominantly assigned to low-income schools. As minority teachers were less transfer-prone in 1969/70, their concentration in these schools resulted in lower actual transfer rates for low-income schools compared to the rates these schools would have had with more typical teaching staffs. But remembering, that a change in district policy seems to have increased transfer chances for minority teachers, these now also leave low-income schools to a greater extent. On the one hand, the district improved the situation for minority teachers, but on the other, the low-income schools are carrying the burden.

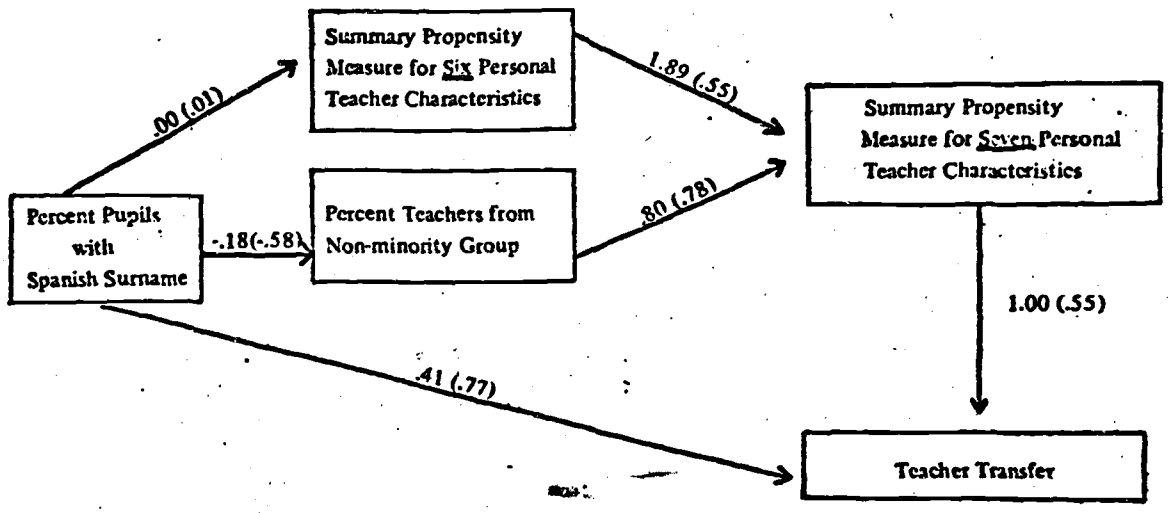
We may summarize these direct and indirect impacts of the socio-economic level of a school's student body on transfer by means of Figure 5. This figure has the basic structure of Figure 4: The effects of school characteristics on mobility are mediated through those of teacher-characteristic staff-compositions as well as being

direct. It is, however, more differentiated, concretizing the conceptual relations, discussed earlier, into operational ones, only including variables with important effects.

This diagram indicates that proportion of pupils with Spanish surname has an allocative effect on the racial-ethnic distribution of teachers (-.18) while showing that it has almost no impact on the original--six characteristic--transfer-propensity measure (.00).

The coefficients referred to in the text and displayed in Figure 5 are unstandardized regression coefficients. All of these are statistically significant (probability less than .02), except for that relating Spanish surname and the six-characteristic propensity which

Figure 5. Path Diagram Relating Specific School and Teacher Characteristics to Teacher Transfer (1969/70 - 1971/72)



(Path regression coefficients linking measures with path coefficients in parantheses.)

is essentially zero. These coefficients were obtained directly from Table 8, when possible, and by hand computation from other tables (Harnischfeger, 1973, d: Tables 8, 14, and 17), when the coefficients not involving transfer rate, were required. The coefficients in parantheses are standardized and were computed from the unstandardized ones using the relevant ratios of standard deviations.

The summary transfer prediction, based on seven teacher characteristics, is defined as the "optional" combination of the six-characteristic transfer-propensity (1.89), based on the teacher characteristics investigated in Section 4, and the percent non-minority teachers (.80). It represents the predicted transfer rate that would have been obtained if the teachers' racial-ethnic distribution had been included in the earlier analysis. Finally, the large positive direct impact of percent Spanish surname pupils on transfer (.41) is indicated.

The diagram summarizes all of the detected effects, both direct and indirect, of a student body's social-class level on transfer. The indirect effect of these pupils can be characterized as the product of their staff-allocation effect (-.18) and the effect of staff composition (.80) on transfer. This product (-.14) is negative implying that direct (.41) plus indirect (.14), or total effect (.27) is diminished by the allocation process. We would have substantially underestimated the socio-economic effects of student bodies, if we had not taken into account these indirect effects via allocation of minority teachers.

We have examined the influence of school characteristics on teacher mobility. We also detailed a conceptual model which characterizes three important aspects of the teacher mobility process: (1) Different types of teachers have different mobility rates, regardless of their teaching location; (2) different kinds of teachers are placed in different teaching environments and, therefore, schools differ in their teacher mobility rates, independently of the attractiveness of their environments; (3) schools do differ in the attractiveness of their teaching environments and this directly accounts for variation in teacher mobility.

This model allows us to assess the extent to which school by school variations in teacher mobility are due to the mobility proneness of different types of teachers, and the extent to which they are due to differences in the attractiveness of teaching environments. It formed the basis of our attempt to unravel the skein of complex causes of teacher mobility.

Our model of the mobility process postulated the determination of teacher mobility by two factors: school characteristics and teaching-staff compositions. We formed predicted mobility rates (propensities) which summarized the mobility-relevant aspects of these staff compositions. Further, the staffs were characterized by their teachers' racial-ethnic group-memberships. If we had analyzed the mobility process without incorporating the aspects of teaching-staff composition, we would have attributed a part of the teacher-characteristic effects to the general school characteristics which are correlated with them.

The process of model building and empirical exemplification which we have gone through, may be more generally characterized:

1) We distinguished, in the data and in the statistical model, between variables defined for individuals and variables defined for institutions. This partition of variables and, therefore, their effects implies a hierarchical model. This model allows the separation of the effects of policy-important institutional variables in to structural (direct) and compositional (indirect) sub-categories.

2) The individual-level component of our model allows assessment of the distinct effect of each individual-level variable.

3) On the basis of the institutional-level component of our model, we may assess two kinds of institutional effects: those on the distributions of individual-level variables, i.e., on the kinds of persons acting in different institutions, and those directly on outcomes.

4) Via the above decomposition of total effects in the model, we may assess both direct and indirect effects of institutional-level policy variables on outcomes: those mediated through the distribution of kinds of institutional actors and those direct affecting outcomes.

This model will be extremely useful in the assessment of school effects. In any general study of the socialization process, it is irremissible not to distinguish between the consequences of a child's characteristics, *acquired outside of an institution*, from the direct effect of the institution on children. Nursery schools and day care centers, for example, are gaining crucial importance in children's socialization. Different kinds of preschools are available to different kinds of children. These allocation processes create difficulties in commensurate evaluation of those schools. Differences in outcomes can be either mainly caused by differences in prior

characteristics of the attending children or by differences in the schools and their programs. In order to explicitly and effectively take this factum into account, a model similar to the above is a stringent necessity. Only by this means can valid policy implementations concerning program, staff, and school organization be warranted.

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